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COST OF CLEAN WATER. VOLUME I. MUNICIPAL INVESTMENT NEEDS

Environmental Protection Agency
Washington, D.C.

March 1971

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PB 228 026

COST OF CLEAN WATER

VOLUME 1

MUNICIPAL INVESTMENT NEEDS

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ENVIORNMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
MARCH 1971

i.

ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D. C. 20460

OFFICE OF THE
ADMINISTRATOR

Honorable Spiro T. Agnew
President of the Senate
Washington, D. C. 20510

Dear Mr. President:

I am transmitting to the Congress the fourth annual report on the national requirements and costs of water pollution control as required under Section 26(a) of the Federal Water Pollution Control Act, as amended.

Our current estimate of investment requirements for municipal treatment works is $12 billion as reflected in the legislative proposal transmitted last month

Volume I of the report, Municipal Investment Needs, describes the analyses and surveys which were undertaken in arriving at this estimate of investment needs. The results of these studies led to a request for a $6 billion Federal program, $2 billion in each of the Fiscal Years 1972-1974 to meet total investment goals of $12 billion.

The several analyses of investment requirements made over time, by contacts with communities, construction grant project reporting systems and statistical models, showed a substantial variability in the investment needs as reported over time by individual States and municipalities. The reasons for variability include changes in treatment requirements imposed by water quality standards, impacts of inflation in the construction sector, construction schedule changes, refinement of individual plant cost estimates as construction nears, and community expectations with respect to magnitude and direction of Federal and State assistance programs.

The size, complexity and dynamic nature of the municipal investment in waste treatment systems prevent the development of fixed long term estimates and point instead toward a need for periodic reappraisal. It is also abundantly clear that reappraisals must make adequate provisions for incorporating new solutions to waste problems rather than continuing commitment to out-dated plans or technologies.

Our analyses this year, as in previous years, have addressed the issues of cost-effectiveness, industrial utilization of municipal facilities and sewerage service charges. There is no doubt that a massive investment program is needed, but the absolute magnitude of the investment required to produce a given set of waste reduction

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effects will vary depending upon the allocation of resources to projects and the degree of cost-effectiveness with which investments are made.

Volume II, Cost-Effectiveness and Clean Water addresses several of the issues associated with planning, design and operating inefficiencies. While construction sector inflation and changing requirements will operate to increase costs, there is convincing evidence that substantial savings in investment requirements can result from cost-effective planning of municipal waste systems. This has been clearly demonstrated through our experience in reviewing community waste treatment proposals. We are working to influence such decisions through our administration of the Federal grant program.

The results of user charge and cost analyses lead us to believe that a high order of municipal utility management coupled with an adequate user charge system could lead to self-sufficient utility based municipal systems freeing them from dependence on Federally dominated categorical grant programs. In addition, such user charge systems should encourage industries to reduce their wastes.

Our recent legislative proposal, the regulations promulgated on July 2, 1970, directed toward planning requirements, and new planning guidelines published on January 29, 1971, direct themselves to the significant questions of self-sufficiency and cost-effectiveness. Further intensive efforts in this important area are underway in the Environmental Protection Agency.

The Administration has taken action to control the impact of sectoral inflation in the construction industry. As pointed out in the current report, past construction sector inflation has served to raise investment needs. These actions, coupled with cost-effective investment planning, can be expected to increase productivity of the waste facilities dollar.

In the broader scope of water quality management, we must not ignore the problems posed by waste sources other than municipal sources and which are in many cases infinitely more complex to solve. Volume II therefore includes an initial assessment of the relative cost-effectiveness of investments in terms of these several problem areas. These analyses provide a point of departure for developing and implementing cost-effective abatement of water pollution across

its many sources. This approach is part of the Environmental Protection Agency's effort to develop more effective integrated approaches to environmental management.

Sincerely yours,

William D. Ruckelshaus

William D. Ruckelshaus
Administrator

Enclosure

V.

ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D. C. 20460

OFFICE OF THE
ADMINISTRATOR

Honorable Carl B. Albert
Speaker of the House of
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Washington, D. C. 20515

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William D. Ruckelshaus

William D. Ruckelshaus
Administrator

Enclosure

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INTRODUCTION

The purpose of this volume is to report to the Congress the results of the cost estimates for municipal needs as of December 1970, based upon a survey made by the Water Quality Office, Environmental Protection Agency. The report also compares the results of the most recent survey with the January 1970, cost estimates for municipal waste treatment systems which were provided to the Congress last year.

The objectives of the December survey were to produce the best possible estimate of needs, using the most current and accurate information available at that point and time. Simultaneously with conducting the survey we also sought to identify the problems which existed and needed to be resolved in the evolving WQO system for needs assessment. This report describes in summary form, how this system has evolved over the past several years.

This volume of the report concerns itself with documentation of planned facilities for municipal waste handling as developed historically and most important through the December 1970 assessment. It describes the present needs assessment system, and the techniques utilized in the December 1970 analysis. The estimate is compared with the January 1970 estimate of $10.2 billion, on a national and State-by-State basis.

SUMMARY AND CONCLUSIONS

The Federal Water Quality Administration made three assessments in 1970. The first assessment was undertaken in January 1970 and was basically a compilation of information provided by States. The second assessment, in July 1970, was unique in that, for the first time, large scale contacts were made directly with the major cities around the nation to ascertain estimates of their construction requirements. The December 1970 study was undertaken to obtain the most up-to-date data on construction needs necessary for the development of meaningful future authorization levels concomitant with the preparation of new legislation and followed the pattern of the July survey.

The December 1970, assessment yielded a total investment need of $12.6 billion for municipal waste treatment facilities covering the period December 1970 through the end of Fiscal Year 1974. To provide a consistent time-frame for comparison of analysis made in January 1970 and December 1970, it was necessary to adjust for the construction supported by grants made between January and December which amounted to approximately $1.9 billion.

The difference between the January 1970 and the December 1970 estimates is mostly accounted for by increased expenditures associated with Enforcement Conferences, upgrading of requirements in water quality implementation plans, changes in State legislation, and generally improved quality of the estimates. (The latter was particularly affected by the imposition of new policies, standards, and regulations and their effect upon individual States and cities; the refinement of cost estimates as projects proceed to the construction stage; the revision of estimates to take account of construction industry cost increases.)

The December 1970 estimate for municipal waste facilities needs is believed to be the best representation of National needs obtainable at this time. At the same time it must be recognized that municipal waste treatment investment needs are the results of a dynamic process of assessment and reassessment. In addition, many exogenous factors which are described elsewhere in this report operate to make this an elusive and rapidly changing value. However, the dynamic nature of investment means that we must accept a reasonable magnitude of this need at any point in time for policy decisions. Continual checking of progress made against investment goals as well as changes in this target itself must be monitored closely and any system of investment assistance must have the flexibility to adjust to these changes in circumstances.

In addition, other analyses have indicated that proper cost-effectiveness considerations can serve to reduce investment needs by increasing the facility productivity. While inflation has been working to increase needs, cost-effectiveness improvements in planning and technology transfer can be expected to reduce costs. Because of the gains expected to be achieved by ongoing efforts in EPA, the total needs estimate was reduced to $12.0 billion from the assessment value of $12.6 billion.

THE NEEDS ASSESSMENT SYSTEM AND HOW IT HAS EVOLVED

The Problem

The problem of determining needs for sewage facilities and related costs has plagued program administrators for years. Not only is he faced with the dynamic nature of investment needs described earlier, exogenous factors act to change the need at the same time he is attempting to measure it. He is also faced with the problem of definition and interpretation of what is being measured and what costs are involved as well as the availability of appropriate data to resolve these questions to a high degree of certainty. At least three basic elements are involved in the technical assessment process.

A. Requirements for Waste Handling Facilities

--Quantity of sewage
--Uses of receiving water: water supply, recreation, navigation, irrigation, etc.
--Degree of treatment required: secondary, advanced waste treatment, etc.

B. Costing Factors

--Climate (choice of unit process)
--Regionalization (economies or diseconomies of scale) and interceptor/waste treatment plant cost ratio
--Dispersal of customers
--Soil properties
--Topography (gravity flow vs. pumping)
--"Ineligible" costs as collection sewers, trunk sewers, others
--Time schedule
--Existing urbanization
--Treatment technology

C. Aggregation

The method of obtaining projections of costs versus time for communities, and summing these for the nation.

Past Related Efforts

The first major effort at consolidating case-by-case estimates into a national waste treatment cost estimate was the annual reports by the Conference of State Sanitary Engineers from 1959 to 1966.

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The Water Quality Office's "Cost of Clean Water" (1968) used information from a previous inventory of current urban facilities and a previous survey of present and anticipated urban needs to make a five-year projection of capital outlay for waste treatment.

The "Economics of Clean Water" (1970) derived its dollar estimate of national waste treatment needs from two sources: from an existing case-by-case inventory and from a statistical model approach. These two approaches yielded very similar cost estimates on a national aggregate basis.

The estimates contained in this current report are predominantly based on detailed case-by-case (locality-by-locality) assessment of present and planned construction of facilities for municipal waste management.

Historical Perspective

The Water Quality Office needs assessment system has evolved over a 14-year period, a period marked by great changes in the national attitudes toward water quality control. In dealing with "the problem" on a national basis, a number of relevant events led to the present situation.

--1956: Public Law 84-660, approved July 9, did not provide for a Federal survey of needs--determination of needs was considered a State responsibility.
--1957: DWSPC, PHS program established "monthly reporting" of applications in the regional offices, applications reported by the State agencies as being under preparation in the communities, for short-term work estimates. This covered applications for funds only, not future needs.
--1959: Conference of State Sanitary Engineers (CSSE) agreed to make annual survey of States to establish long-term needs.
--1966: FWPCA "monthly report" was expanded to include under "applications in preparation" all identifiable needs for which an application had not been filed with the State agency. The time frame for the needs was not yet established.
--1967: CSSE withdrew from survey after criticism by the Congress of that annual survey of States to establish long-term needs.
--1968: State Program Plan (SPP) instructions were revised to require a listing of needs on a one-year basis and a five-year basis. FWQA experience has shown great variation in States' methodology in responding.
--1969: FWQA began conversion of "monthly reports" to provide a continuous appraisal of treatment plant construction related to water quality standards.

--1969: FWQA "monthly report" was revised to cover only applications in the Regional Offices, and needs on the SPP one-year and five-year lists for Fiscal Year 1970.

--1969/1970: WQO's "Cost of Clean Water" (1969) and "Economics of Clean Water" (1970) developed projected needs data using statistical techniques. These are described in detail in those reports.

--1970: Monthly reports incorporated the SPP one-year and five-year lists for Fiscal Year 1971. Regulations now require River Basin and/or Regional Plans; this will have great impact on structuring long-range planning, and more valid estimates of long-range needs should result.

1970 STUDIES

The first special assessment took place in January 1970, and was basically a State-oriented effort. States were contacted and requested to examine their list of projects and costs, which had been reported to the Federal Water Quality Administration in December 1969, to determine if they represented the appropriate construction needs at that time. In general, there was not sufficient time available for the States to reevaluate their December submissions and update them accordingly. In States such as the New England States, New York, Maryland, Indiana and Missouri, where major programs were initiated in the mid-60's, the information on needs was well defined. However in the other States assistance programs were either in the early stage of development (such as New Jersey, Michigan etc.) or in the early stages of consideration. Estimates from these States did not include the kind of data needed for indepth analyses.

The assessment performed in July 1970 was different from previous studies in that, for the first time, large scale contacts were made directly with approximately 1,000 major cities throughout the nation to ascertain estimates of their construction plans. This interim estimate utilized updated information from contacts with States and municipalities, more recently submitted States needs lists, and approximations of other known needs prepared by the Federal Water Quality Administration Offices.

The need for the December 1970 assessment was based on the fact that the present Water Quality Office legislation, with its appropriation authorization, would expire at the end of Fiscal Year 1971. Accordingly, to effectively prepare new legislation and, more particularly, develop meaningful future authorization levels, it was necessary to have available the best possible up-to-date data on construction needs. The approach selected was to reassess the construction costs for all communities whose proposed projects were estimated to cost $5 million or more. Since the cost of these projects represented about 3/4 of the total cost of all projects, it was believed that, by validating the cost of this block of projects, considerable reliability could be attributed to the resultant total figure (which includes data for approximately 9,000 projects identified in the WQO Pending Needs file).

Assessment of Needs Method

The assessment method alluded to above (Needs Assessment System and How it Evolved) was used in each of the three studies made in 1970. The basis of the method are the case-by-case (locality-by-locality) documentations of facilities for municipal waste treatment. Results

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are incorporated in the Facilities Construction Program's "Pending" File and are updated monthly with new and revised project information received from the States.

As part of the perspective in "needs estimation", it is important to point out that the costs depend on the level of treatment required. Although State interstate water quality standards must be approved by the Federal government, each State has latitude in setting goals for intrastate waters and these goals greatly affect costs. Some States have not yet received approval of their interstate standards, and some do not have intrastate standards so investments approximated for them are not as firm as for others. Other States, as a result of national awareness of the environment, have reacted by upgrading both water quality criteria and implementation schedules. The difference between Water Quality Office's January and July estimates is, in a way, a measure of this increased response over a six-month period.

Additional information was gathered in the December assessment (with special emphasis on data for major cities) so that a more detailed analysis of the needs could be performed. In particular, estimates were obtained on the volume of industrial waste associated with the proposed construction, and on construction needed to comply with water quality standards and enforcement actions.

RESULTS OF ASSESSMENT

The results are summarized on the lists attached:

Attachment A - Estimates of Backlog of Needs for Construction of Sewage Treatment Facilities (Estimates as of December 31, 1969)

Attachment B - Estimated Cost of Construction of Municipal Sewage Treatment for the Period December 1970 Through June 1974

Attachment C - Percent Industrial Waste to be Treated by Projects to be Initiated Through FY 1974 in Cities With Projects Costing $5 Million or More

Attachment D - Portion of Cost of Construction of Sewage Treatment Facilities Through FY 1974, in Cities With Projects Costing $5 Million or More Related to Industrial Waste (By Flow)

Attachment E - Estimated Cost of Construction Through FY 1974, According to Regulatory Requirements

Discussion

As previously mentioned from an overall point of view the January 1970 figures were lower than the second two estimates. In fact, the $10.2 billion projected in January would have been lower still had not some of the States, at FWQA urging, prepared revised estimates based on their own knowledge regarding shortcomings of their previously reported estimates.

The $12.2 billion estimate obtained in July 1970 and projected through FY 1974 represented an assessment in which individual community estimates for the first time, were given detailed scrutiny. The $12.2 billion figure was revised to $12.6 billion on the basis of reassessments made in December 1970 chiefly from cities planning the construction of sewage treatment facilities costing $5 million or more (in States without cities planning projects of this magnitude, the city having the largest cost under $5 million was selected). A large part of the total increase was accounted for in one major city--Chicago.

From an overall point of view there are some general factors which have had a pronounced effect on the quality and accuracy of the estimates of construction needs. These factors include:

1. Availability of more Federal and State funds. The combination of greatly increased levels of Federal appropriations and the establishment by more States of matching grant programs has changed the indebtedness requirements of many communities planning or required to construct waste treatment facilities. Debt ridden cities can be more responsive to meeting their needs in this area when their financial requirements are reduced from 70% to 25% of the eligible cost of construction. Communities have been more willing to define needs and develop concrete plans for moving ahead with construction programs.

2. Recognition of the need for better estimates. Just as the Federal government, in the course of providing abatement needs, recognizes the necessity for reliable assessments in order to better manage the program from a financial point of view, so the States, which must borrow or appropriate funds to meet expected matching grant requirements, recognize a similar (if not greater) need for such accuracy. The combination of pressures from these two directions is helping to bring about the desired end--a more complete identification of the needs and a more accurate estimate of the associated costs.

3. Imposition of new policies, standards, and regulations and their effect upon individual States and cities. Federal and State water quality standards, enforcement proceedings, basin planning and regionalization requirements do not remain static nationwide, nor are the timeframes fixed or unalterable. As a result, construction plans and schedules must adjust to fit these changes, and almost without exception the changes result in significant cost increases. Thus the needs figure is a dynamic rather than static quantity.

4. Refinement of cost estimates as projects proceed to the construction stage. As a project proceeds from the conception to the construction stages, in addition to undergoing cost refinements, it may also undergo changes in scope as well as in plant capacity or levels of treatment. Clearly, such changes have an effect upon costs. Clearly, too, the larger the project, the greater may be the cost changes.

5. Cost increases in the construction industry. For example, unprecedented cost increases in 1970, have resulted in an upward revision of the previous year's figures.

In the main, the above general reasons account for the cost changes during calendar year 1970 for the cities identified in the December 1970 assessment.

COST EFFECTIVENESS AND INVESTMENT NEEDS

The December 1970, assessment indicated an investment need of $12.6 billion. Consideration of the influence of better reviews to assure cost-effective projects, better planning of waste management systems and more rapid utilization of new technology in practical situations led to a reduction of this need estimate to $12.0 billion in planning the Federal program.

Our evaluation has revealed that relatively minor adjustments in project features can yield equivalent waste treatment at a lower cost. A few examples drawn from actual situations will illustrate the potentials for better analysis of projects.

First, consider the case of three communities located sequentially along the same river, with Community A lying upstream of B and B upstream of C. Communities B and C have adequate waste treatment facilities; indeed Community C has excess capacity in its treatment plant and Community B's facility, funded partially by a Federal grant was explicitly designed to handle the wastes of upstream Community A and approved on that basis. Subsequently Community A submitted a grant application to fund an interceptor sewer to convey its wastes to Community C's treatment plant, passing directly by the previously intended treatment point at Community B. Apparently there had been a local problem leading to a rift between A and B.

Analysis of this situation showed that this "falling out" would cost an additional $1 million to be expended on a total project cost of $5.2 million. Returning to the original regional system concept would show a saving of about 20% over reported needs.

A second case is even more simple in nature. A single community applying for a grant assumed a growth in per capita sewage flows 3 1/2% per year, whereas something on the order of 1/2% would have been more relevant to the situation. The difficulty lay in the fact that the growth rate was only implicit in the application information requiring thorough analysis to detect it. The project cost, using a more reasonable rate of per capita sewage flow growth would be reduced from $820,000 to about $615,000 or a saving of some 25% in what would have been unused excess capacity. (See Volume II for a detailed discussion of the overcapacity problem.)

A third illustration hinges on the time phasing of a regional system development. Existing plans called for a series of local treatment plants to be constructed now and abandoned at a specified date in the

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future at which time a centralized waste transmission and treatment facility would be constructed. This might be a conclusion reached in a situation where future growth was thought to be necessary to development of a larger regional system to achieve economics of scale in transmission. More careful analysis of this situation revealed that a cost saving of 16% could be achieved by skipping over the local treatment phase and moving immediately to the regional system.

These are only a few of the many examples which could be cited to illustrate the point of investment need reduction by wider application of cost-effectiveness measures. Implementation of the July 2, 1970, regulations dealing with adequate planning on both a basin and utility system basis as well as the planning guidelines issued on January 29, 1971, are important steps toward achieving better utilization of the investment dollar. Design, operation and maintenance guidelines issued initially in September 1970, and to be supplemented by timely technical guidelines will serve to further enhance productivity of the waste facility investment dollar. Continued efforts in this direction are underway in the Environmental Protection Agency as a realization of the significant effort that must be devoted to a major public policy problem of the 1970's--efficient investment of the greatly increased resources proposed to be invested in waste treatment facilities.

ATTACHMENT A

Estimates of Backlog of Needs for Construction of Sewage Treatment Facilities* (Estimates as of December 31, 1969)

	Need for Construction Funds in $1,000
TOTALS	$10,217,076
Alabama	35,000
Alaska	12,025
Arizona	86,000
Arkansas	32,952
California	651,843
Colorado	133,000
Connecticut	280,470
Delaware	28,000
Dist.of Columbia	355,000
Florida	200,000
Georgia	150,000
Hawaii	14,442
Idaho	493
Illinois	437,225
Indiana	152,585
Iowa	33,334
Kansas	61,000
Kentucky	62,598
Louisiana	140,000
Maine	140,924
Maryland	236,900
Massachusetts	438,045
Michigan	253,683
Minnesota	136,265
Mississippi	40,000
Missouri	390,000
Montana	13,455
Nebraska	62,000
Nevada	28,550
New Hampshire	138,000
New Jersey	880,000
New Mexico	9,913
New York	1,900,110
North Carolina	69,263
North Dakota	22,000
Ohio	432,507
Oklahoma	65,332
Oregon	135,000
Pennsylvania	432,000
Rhode Island	51,531
South Carolina	75,000
South Dakota	27,000
Tennessee	105,545
Texas	525,000
Utah	11,677
Vermont	70,000
Virginia	151,000
Washington	160,000
West Virginia	44,305
Wisconsin	243,714
Wyoming	12,000
Guam	6,156
Puerto Rico	28,884
Virgin Islands	15,350

*Information derived (1) from Pending Report (Dec. 31, 1969) prepared monthly by WQO from data continuously furnished by States to Regional Offices and (2) in States where full pending data lacking, from estimates obtained from States by telephone on January 28, 1970.

ATTACHMENT B

Estimated Cost* of Construction of Municipal Sewage Treatment Works
For the Period December 1970 through June 1974**
(million dollars)

	Total
TOTALS	$ 12,565.2
Alabama	27.0
Alaska	28.1
Arizona	51.0
Arkansas	42.0
California	737.5
Colorado	47.4
Connecticut	229.5
Delaware	62.0
Dist.of Columbia	347.2
Florida	444.2
Georgia	74.0
Hawaii	50.8
Idaho	14.5
Illinois	1,043.6
Indiana	174.8
Iowa	111.9
Kansas	52.7
Kentucky	117.0
Louisiana	132.7
Maine	157.4
Maryland	349.7
Massachusetts	422.6
Michigan	788.8
Minnesota	295.2
Mississippi	34.1
Missouri	268.2
Montana	31.4
Nebraska	49.0
Nevada	47.2
New Hampshire	137.8
New Jersey	1,308.7
New Mexico	19.6
New York	1,721.0
North Carolina	125.3
North Dakota	8.4
Ohio	733.5
Oklahoma	69.8
Oregon	78.6
Pennsylvania	616.4
Rhode Island	37.7
South Carolina	57.6
South Dakota	13.5
Tennessee	88.9
Texas	398.7
Utah	22.6
Vermont	38.0
Virginia	280.1
Washington	216.3
West Virginia	51.4
Wisconsin	190.8
Wyoming	1.7
Guam	9.7
Puerto Rico	93.0
Virgin Islands	14.6

*Based on 1970 dollars.
**Excluding Storm Water Overflow Facilities.

ATTACHMENT C

Percent Industrial Waste To Be Treated By Projects To Be Initiated Through FY 1974 In Cities With Projects Costing $5 Million or More

	0 - 30%	31% - 50%	51% - 70%	71% - 100%	Total Projects
TOTALS	787	54	22	10	873*
Alabama	1	--	--	--	1
Alaska	7	--	--	--	7
Arizona	7	--	--	--	7
Arkansas	8	--	--	--	8
California	146	3	1	--	150
Colorado	5	--	--	--	5
Connecticut	11	2	1	--	14
Delaware	3	--	--	--	3
Dist.of Columbia	5	--	--	--	5
Florida	38	--	--	1	39
Georgia	1	2	--	--	3
Hawaii	6	--	--	--	6
Idaho	1	--	--	--	1
Illinois	25	17	1	1	44
Indiana	10	--	--	--	10
Iowa	5	4	2	1	12
Kansas	4	--	--	--	4
Kentucky	3	--	--	1	4
Louisiana	26	--	--	--	26
Maine	2	--	2	--	4
Maryland	50	--	--	--	50
Massachusetts	15	4	2	1	22
Michigan	21	3	2	--	26
Minnesota	19	--	--	--	19
Mississippi	1	--	--	--	1
Missouri	21	--	--	--	21
Montana	1	1	--	--	2
Nebraska	4	--	--	--	4
Nevada	7	--	--	--	7
New Hampshire	3	--	3	2	8
New Jersey	43	6	1	--	50
New Mexico	3	--	--	--	3
New York	47	2	1	1	51
North Carolina	5	2	3	--	10
North Dakota	1	--	--	--	1
Ohio	38	3	1	--	42
Oklahoma	11	--	--	--	11
Oregon	8	--	--	--	8
Pennsylvania	23	--	--	--	23
Rhode Island	2	--	--	--	2
South Carolina	4	--	--	--	4
South Dakota	--	--	1	--	1
Tennessee	2	--	--	--	2
Texas	71	--	--	--	71
Utah	2	--	--	--	2
Vermont	1	--	--	--	1
Virginia	37	2	--	--	39
Washington	7	--	--	1	8
West Virginia	1	--	--	--	1
Wisconsin	10	3	1	1	15
Wyoming	1	--	--	--	1
Guam	1	--	--	--	1
Puerto Rico	12	--	--	--	12
Virgin Islands	1	--	--	--	1

*Excludes 6 projects which provide storm overflow treatment only.

ATTACHMENT D

Portion of Cost of Construction of Sewage Treatment Facilities
Through FY 1974 In Cities With Projects Costing $5 Million or More
Related To Industrial Waste (By Flow)*
(million dollars)

	Total Cost	Industrial Share
TOTALS	9,302.9	1,629.5
Alabama	5.9	.6
Alaska	16.9	0
Arizona	19.2	.9
Arkansas	16.1	0
California	475.4	67.7
Colorado	43.5	0
Connecticut	175.7	38.3
Delaware	35.5	4.3
Dist.of Columbia	347.2	0
Florida	347.9	15.0
Georgia	33.1	8.4
Hawaii	27.8	2.3
Idaho	3.1	0
Illinois	914.6	316.7
Indiana	72.0	10.0
Iowa	80.4	37.1
Kansas	28.5	0
Kentucky	65.3	11.6
Louisiana	92.4	0
Maine	71.3	12.5
Maryland	287.9	1.6
Massachusetts	282.6	76.7
Michigan	584.8	117.1
Minnesota	238.2	50.1
Mississippi	6.0	1.1
Missouri	239.4	43.3
Montana	12.0	3.7
Nebraska	33.7	0
Nevada	38.8	1.8
New Hampshire	97.4	58.3
New Jersey	1,283.8	380.1
New Mexico	11.2	0
New York	1,337.0	141.0
North Carolina	49.7	5.8
North Dakota	1.5	0
Ohio	580.7	74.0
Oklahoma	36.3	0
Oregon	64.4	9.1
Pennsylvania	172.7	24.4
Rhode Island	12.0	2.6
South Carolina	9.2	0
South Dakota	5.0	3.0
Tennessee	44.7	11.2
Texas	329.5	0
Utah	2.6	.4
Vermont	2.2	0
Virginia	213.9	22.1
Washington	140.0	5.2
West Virginia	6.0	.6
Wisconsin	213.9	66.0
Wyoming	.6	0
Guam	1.9	0
Puerto Rico	88.4	4.1
Virgin Islands	3.1	.8

*Excluding cost of treating storm water overflow facilities.

ATTACHMENT E

Estimated Cost of Construction Through FY 1974*
According to Regulatory Requirements
(million dollars)

	"A"	"B"	"C"	Other	Total
TOTALS	5,483.2	2,141.3	874.9	4,065.8	12,565.2
Alabama				27.0	27.0
Alaska	28.1				28.1
Arizona				51.0	51.0
Arkansas	29.0			13.0	42.0
California	129.1			608.4	737.5
Colorado				47.4	47.4
Connecticut	229.5				229.5
Delaware	25.1			36.9	62.0
Dist.of Columbia		347.2			347.2
Florida		154.6	74.6	215.0	444.2
Georgia		61.0		13.0	74.0
Hawaii	50.8				50.8
Idaho	14.5				14.5
Illinois	914.2		63.7	65.7	1,043.6
Indiana	23.1	66.1	48.6	37.0	174.8
Iowa				111.9	111.9
Kansas	48.8			3.9	52.7
Kentucky	105.3			11.7	117.0
Louisiana	39.0			93.7	132.7
Maine	88.1		69.3		157.4
Maryland		49.0	109.1	191.6	349.7
Massachusetts	385.0		37.6		422.6
Michigan	518.2	41.0		229.6	788.8
Minnesota		186.0		109.2	295.2
Mississippi			34.1		34.1
Missouri	225.3			42.9	268.2
Montana	31.4				31.4
Nebraska	31.7			17.3	49.0
Nevada	40.9			6.3	47.2
New Hampshire	120.4		7.2	10.2	137.8
New Jersey	999.9		157.0	151.8	1,308.7
New Mexico			14.5	5.1	19.6
New York	432.0	509.4	141.1	638.5	1,721.0
North Carolina				125.3	125.3
North Dakota				8.4	8.4
Ohio	112.9	470.2	49.9	100.5	733.5
Oklahoma				69.8	69.8
Oregon	60.1		1.3	17.2	78.6
Pennsylvania				616.4	616.4
Rhode Island	37.7				37.7
South Carolina	13.8			43.8	57.6
South Dakota	13.5				13.5
Tennessee				88.9	88.9
Texas	398.7				398.7
Utah	22.6				22.6
Vermont			38.0		38.0
Virginia	43.4	111.2	28.9	96.6	280.1
Washington	210.0			6.3	216.3
West Virginia	51.4				51.4
Wisconsin		145.6		45.2	190.8
Wyoming				1.7	1.7
Guam	9.7				9.7
Puerto Rico				93.0	93.0
Virgin Islands				14.6	14.6

***Excluding Storm Overflow Facilities.**

"A" Implementation plans
"B" Enforcement actions
"C" State orders or other State regulatory requirements

* U. S. GOVERNMENT PRINTING OFFICE : 1971 O - 434-781